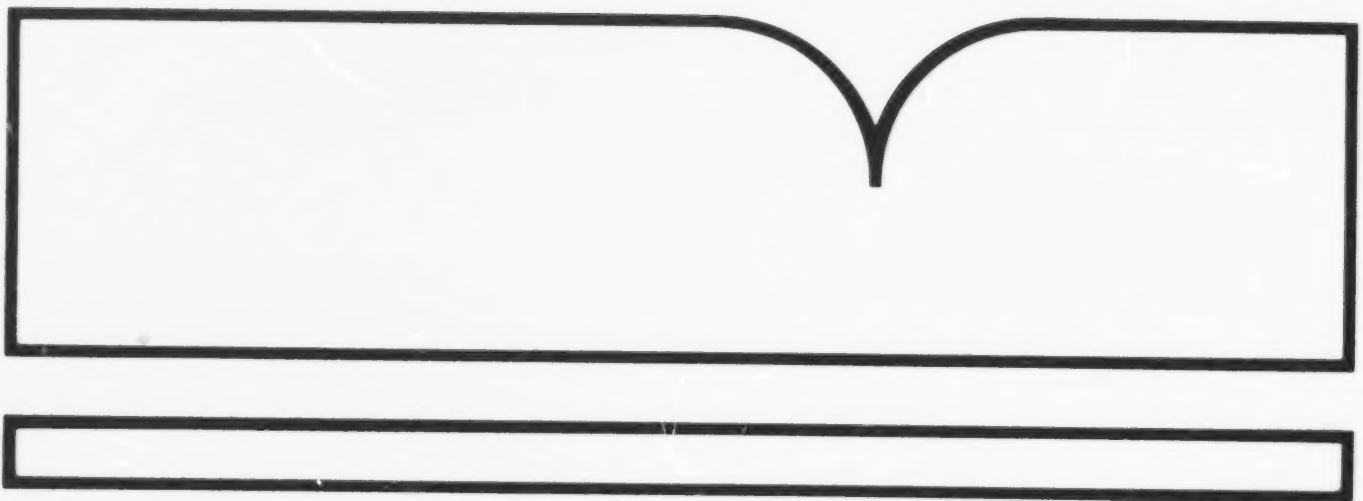


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Source Reduction as an Option for Municipal Waste Management

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Source Reduction as an Option for Municipal Waste Management

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16. ABSTRACT Effective source reduction strategies depend upon solid planning and the setting of reasonable goals. In this paper the author reviews what various others are doing in the U.S. and elsewhere to further source reduction and outlines options that might be considered by those considering source reduction as a strategy for addressing various components in the municipal solid waste stream. "Source reduction" is a term used to describe techniques, strategies, and technologies that eliminate or reduce the volume or toxicity of waste materials. It is the first element in the widely cited waste management hierarchy that is proposed by the EPA and others as guidance for an effective waste management system. Source reduction may occur through the design and manufacture of products and packaging with minimum volume of material, and for a longer useful life. Source reduction may also be practiced at the corporate or household level through selective buying habits and reuse of products and materials. Effective source reduction slows depletion of environmental resources, prolongs the life of available waste management capacity and can make combustion and land-filling of wastes safer in the short and long term by removing toxic constituents.		
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Abstract

A review of options for reducing the generation of various materials that commonly appear in the municipal solid waste stream.

"Source reduction" is a term used to describe techniques, strategies, and technologies that eliminate or reduce the volume or toxicity of waste materials. It is the first element in the widely cited waste management hierarchy that is proposed by the EPA and others as guidance for an effective waste management system.

Source reduction may occur through the design and manufacture of products and packaging with minimum volume of material, and for a longer useful life. Source reduction may also be practiced at the corporate or household level through selective buying habits and reuse of products and materials. Effective source reduction slows depletion of environmental resources, prolongs the life of available waste management capacity and can make combustion and land-filling of wastes safer in the short and long term by removing toxic constituents. Source reduction is not used by local waste handlers for managing the waste that is picked up every day; rather, it cuts back on the amount and the toxicity of the waste which is handled.

Effective source reduction strategies depend upon solid planning and the setting of reasonable goals. In this paper the author reviews what various others are doing in the U.S. and elsewhere to further source reduction and outlines options that might be considered by those considering source reduction as a strategy for addressing various components in the municipal solid waste stream.

Introduction

"Clearly, in the long run, source reduction and recycling offer the most economically and environmentally sound methods for dealing with much of the solid waste stream....Congress should stimulate recycling and source reduction and the development of comprehensive solid waste management plans and programs....Tax and financial incentives should be developed to stimulate source reduction, reuse, and recycling programs.-..Federal, state and local programs should be directed toward extensive public education and the need for reducing and recycling solid waste".

These statements are extracted from your Official Policy of the National Conference of State Legislatures that was adopted in July 1988. By adopting this policy the Conference joined many, many, many organizations that believe source reduction is the way to go for easing community problems presented by increasing solid waste generation rates. The USEPA is certainly among such groups. In its recently published "The Solid Waste Dilemma: An Agenda for Action" (which, incidentally is printed on recycled paper, a small contribution to developing the market for recycled waste materials). This is something each of you might want to consider for helping the market absorb materials that might otherwise have to go to one of your local landfills) the EPA stated that it is the Agency's goal to manage 25 percent of our nation's municipal waste through source reduction and recycling by 1992.

And it is not just big organizations and agencies touting source reduction. In the April 19, 1989 issue of the Cincinnati Enquirer, a citizen wrote in to say "If we want to reduce the many kinds of pollution, including solid waste disposal, we need to look at the source of the pollution and eliminate it at the source. Recycling is of major

importance, but much of the packaging around products is not recyclable. Why can't we eliminate all of that ridiculous, unnecessary plastic and styrofoam? It rapidly ends up in our waste can, and very soon after that we find it polluting our ground, water, and wildlife."

What I would like to do today is to explore with you this whole concept of source reduction, share some observations of others and myself, and maybe trigger some thoughts that might contribute to coming up with some programs or approaches that will assist in to reducing the generation of solid waste in the country.

Much of the information that I will be summarizing today was taken rather shamelessly from what I have found to be the best publication on solid waste management in the U.S.- the Background Document for the aforementioned EPA's "The Solid Waste Dilemma: An Agenda for Action"; (EPA/530 SW 88-054A). This document is available from the National Technical Information Service as document #PB88-251-137. If you get nothing at all from my talk but a commitment to order that publication, your time will have been well spent.

What is Source Reduction?

Source reduction is the design, manufacture, and use of products so as to reduce the quantity and toxicity of waste produced when the products reach the end of their useful lives. Source reduction is not a technology or process (such as landfill, incineration, recycling, or composting), to be applied to the solid waste stream. In applying the concept of source reduction, one fully considers the ultimate destiny of products when making decisions on how the products are made and which

products or materials one uses. The objectives of source reduction measures are:

- To reduce the toxicity of solid waste generated; and
- To reduce the quantity of solid waste generated.

Source reduction activities can occur throughout most of the life cycle (design, manufacture, purchase, use) of a product, container, or package and would involve changes in the way products are made and changes in product consumption. Some examples of source reduction are:

Decreased toxicity. The use of mercury in dry cell batteries has decreased by 65% since 1984.

Increased useful life. Advances in tire design have increased the average useful life span of car tires, and advances in dry cell batteries have increased their useful life by 45% since 1983.

Decreased materials use. Advances in resin technology have led to manufacture of plastic bags and plastic milk jugs with less material than was needed in earlier designs.

Changes in production processes (in-house reuse). In the manufacturing process many materials once discarded (such as trimmings) are being placed back in the production process.

Redesign resulting in less waste generation. The advent of duplex copiers (copiers which use two sides of paper) has made it possible to decrease the amount of paper used; and

Packaging trends. Advances in plastic resins have enabled plastics to replace other heavier and bulkier materials (such as shrink wrap replacing wood crates).

Interestingly, these activities did not, for the most part, stem from efforts to foster source reduction objectives. Rather, they occurred to decrease production costs and increase sales. Manufacturers typically have little incentive to be concerned with the destiny of their products because they bear neither the responsibility nor the cost of handling the wastes that their products ultimately become.

A source reduction ethic is not dominant in today's production or consumption habits. Neither manufacturers nor consumers seem to give serious consideration to waste generation and to the ultimate destiny of the items they make or consume. Rather, production and consumption trends have been leaning toward increasing volumes, and more single-use, nonrepairable and nonrecyclable products, containers and packaging.

Traditionally, municipal solid waste management has relied mostly on technologies that handle waste after it has been generated. Awareness and acceptance is now increasing for the integrated waste management (IWM) approach involving a combination of source reduction, composting, recycling, waste-to-energy, and landfill. While the other elements of integrated waste management have been aggressively pursued, implementation of source reduction measures has been minimal. Why is this, when everyone, with the possible exception of the packaging industries, seems to think it is such a good idea?

I would suggest a combination of factors that have stymied movement of source reduction from policy into action. Traditional solid waste management practices really only impacted persons involved in collection and landfilling of the wastes--product manufacturers and consumers had, and still have little involvement and bear little responsibility.

Source reduction measures, however, could affect all products manufactured, involve changes in design and manufacturing practices, and impact the "throwaway" convenience most Americans have come to expect. In addition, source reduction measures have been slow to gain significant support because the results are not readily visible. For example, it is easier to see the effect of a recycling program processing materials back into products than it is to see the impact of source reduction measures which are preventive (resulting in things not happening and not being generated) and may be long term in nature.

Identifying Source Reduction Candidates

Now, theoretically, any waste material could be the subject of a source reduction approach, and could be eliminated if enough effort was put into making it happen. However, it seems clear that some should be addressed before others and some would be much more amenable to source reduction strategies. So, how do we go about deciding what to do first. We need some decision criteria. The EPA agenda for action proposes four criteria: toxicity, quantity, items with short product life spans, and contributors to the litter problem. Let us look at the solidwaste stream from perspectives using these criteria.

A. Toxicity Contributors

The major toxicity contributors are lead, cadmium, mercury, and chromium. The potential sources of these toxics include batteries, inks, plastic (pigments and fixatives), paper, rubber, and leather products.

Many other chemicals and products known to contribute to the toxicity of solid wastes are categorized as hazardous household wastes.

Some examples of these are used oil, antifreeze, auto batteries, paints and paint solvents, mercury batteries, insecticides, and herbicides. These items are often discarded with municipal solid wastes when they should be kept separate. Programs addressing household hazardous wastes focuses on educating the consumer to shift consumption to less toxic alternatives and separate toxic products from ordinary household waste. These can then be placed out for special collections or taken to special sites where they can be disposed of properly.

Although source reduction does address the problem of household hazardous waste by aiming to minimize toxicity, household hazardous wastes are being handled through programs specifically geared to them.

B. Significant Quantity Contributors

The table below indicates the percentage distribution of total discards for materials and products that are major contributors to the solid waste stream.

<u>Item</u>	<u>Percent of Discards</u>
Paper and Paperboard	
Corrugated Boxes	8.1
Newspapers	6.3
Other Nonpackaging Paper	3.8
Office Papers	3.6
Other Paperboard	3.6
Books and Magazines	3.1
Paper Packaging	2.8

Commercial Printing	2.3
Tissue Paper and Towels	2.1
Total	35.7
Yard Wastes	20.1
Food Wastes	8.9
TOTAL	64.7

Source: Franklin Associates, Ltd. Characterization of Solid Waste in the United States, 1960 to 2000 (Update 1988), final Report, March 30, 1988; Table 2, P.7 and Table 4, p.12; 1986 data.

C. Items with Short Useful Life Spans

A similar distribution can be made for items that have short life spans and enter the waste stream quickly.

<u>Item</u>	<u>Percent of Discards</u>
Containers and Packaging	
Paper and Paperboard	14.5
Glass	7.6
Plastics	4.0
Steel	1.9
Wood	1.5
Aluminum	0.7
Miscellaneous packaging	0.1
Total	30.3
Nondurable Goods	
Newspapers	6.3
Books and Magazines	3.1

Office Papers	3.6
Commercial Printing	2.3
Tissue Paper and Towels	2.1
Other Nonpackaging Paper	3.8
Clothing and Footwear	2.1
Other	2.0
Total	25.2

D. Items that Contribute Significantly to the Litter Stream

Unlike products that enter the solid waste stream through disposal, some products are discarded as litter. The major components of highway litter are shown below.

<u>Item</u>	<u>Percent</u>
Paper	60%
Metals	25%
Plastic	10%
~~Other~~	~~5%~~
Glass	5%

Of course, these aren't the only criteria that could, or even should be used. For instance, two other criteria that are also important are:

- Substitutes/Alternatives: Are comparable substitute materials or products available at about the same cost and function, yet more consistent with source reduction objectives?
- Social good or need served by item: Is there a special or important benefit to society that the product or package serves? ex: tamper-resistant packaging).

Choosing Among Source Reduction Options

Many issues might be considered in order to choose appropriate source reduction measures to direct toward candidates that have been identified. Before reviewing the source reduction options themselves, some consideration should be given to the following factors:

- Effectiveness in achieving source reduction goals.
- Ability of the free market system to address the problem.
- Consistency with the "polluter-pays" principle.
- Social and economic equity.
- Economic efficiency.
- Administrative feasibility and cost.

Options to Promote Source Reduction*

The options outlined below could all be used to stimulate source reduction activities. Although they have been divided into three categories (regulation, economic incentives/disincentives, and education and recognition), options from each category could be used concurrently. For example, a consumer awareness campaign could be coordinated with a tax; the tax would not only raise money but could influence changes in consumption habits. As stated earlier, the review of options below is not meant to provide in-depth analysis, but rather to convey the basic concepts and pros and cons associated with the options.

A. Regulation

Regulatory approaches include prohibitions and controls (restrictions, reporting, testing, approval and labeling requirement) on

*This section is reprinted from "The Solid Waste Dilemma: An Agenda for Action - Background Document."

product and package design, manufacture, marketing and purchasing. One avenue that EPA could explore is whether the Toxic Substances Control Act (TSCA) could be used for the first three procedures outlined below. Coordination with FDA should also be considered when applicable.

(1) Product Constituent Regulation

This source reduction option would target constituents that are known to be in the waste stream and known to be toxic.

Regulations could be directed to new and existing products or packaging. The aim of this option would be to identify toxic constituents and recommend changes if suitable alternatives are available. A range of regulatory options could be used, including product bans, cautionary labeling, approval labeling, and further study.

Pros:

- Reduces waste toxicity
- Increased public awareness
- Free market system function

Cons:

- Standards for constituent identification are lacking.
- Enforcement is costly
- The government intercedes in the market system through bans
- Administering the regulations is costly.

(2) New Product Approval Process

Under current government programs, certain new products can enter the commercial market only after the manufacturers have complied with advance notification, testing, approval, and

labeling requirements. These requirements are designed for consumer health and economic protection (e.g., food contact uses for new packaging materials, truth in advertising), and are not concerned with wastes associated with the product. However, the quantity and toxicity of waste resulting from a product at the end of its useful life could also be considered to impact consumer health and economy.

Manufacturers could be required to notify EPA before introducing a new product or package. The manufacturer would test new products or otherwise demonstrate the impact of the products on the waste stream. The manufacturer would conduct tests, or demonstrate why tests were unnecessary, to determine how the product would perform in a landfill environment, in an incinerator, and in a mixed-waste recycling/processing system. For products demonstrating an adverse impact, EPA would balance the impact against the benefits of the products. If the impacts were greater than the benefit, EPA could exercise regulatory options ranging from labeling to bans, and further study to assess the product's benefits and impacts.

Pros:

- Reduces toxicity of wastes
- Integrates waste concerns into manufacturers' decision-making process
- Improves functioning of waste management facilities

Cons:

- Testing protocol is lacking
- Standards are lacking
- Administering such a program is costly
- The government intercedes in the market system
- Industry will incur costs

(3) Existing Product Reviews

Requiring manufacturers to assess the impact of every existing product they produce would be infeasible. However, there may be some existing products whose impact of the waste stream warrants examination. Criteria could be established to identify products and materials of concern because of waste toxicity. Manufacturers could then be required to test these selected products. Based on the testing or other information, EPA could exercise regulatory options ranging from labeling to bans.

Pros:

- Reduces toxicity of wastes
- Integrates waste concerns into manufacturers' decision-making process.
- Improves functioning of waste management facilities.

Cons:

- Selection criteria are lacking
- Testing protocol is lacking
- Administering the program is costly
- The government intercedes in the market system
- Industry incurs cost

(4) Procurement Restriction

Federal, state, and local governments control the procurement of large quantities of durable and nondurable goods. Control over large quantity procurements makes these government institutions reasonable candidates for regulations fostering procurement of goods that result in waste of lower toxicity and quantity. These regulations could also be extended to firms doing business with government institutions (such as school systems, prisons, government offices, hospitals, etc.).

Possible areas for developing procurement requirements are:

- Purchase of duplex (i.e. double-sided) copiers.
- Purchase of inks with no heavy metals.
- Purchase of remanufactured, repairable, reusable, and more durable products.
- Purchase of only double-sided printing.

In some cases, products resulting in less toxic and/or lower quantity waste may cost more than counterpart products.

Where this occurs, changes in government procurement practices may be especially difficult to implement if the institutions are required to comply with least-cost or lowest-bid policies. The legal authority for government procurement may direct that purchasing requirements can deal only with performance of the goods in service. This narrow authority would not allow the purchasing agency to

consider the waste which results when the goods have served their use.

Successful changes in government procurement practices may motivate industry to follow suit. Also, changes in government procurement could create a demand which would stimulate manufacturing changes, thereby making desirable goods more readily available for other consumer segments.

Pros:

- Reduces quantity and toxicity of wastes
- Provides example for other consumer segments
- Creates a market for desirable products, increasing availability for other consumer segments.
- Free market system functions as before.

Cons:

- Desirable products may cost more
- Least cost or lowest bid policies may hinder implementation.
- Authority to develop appropriate procurement specifications may not exist
- Inertia of existing procurement process may hinder implementation.

B. Economic Incentives or Disincentives

Economic incentives or disincentives could be used to counteract consumer demand for products that cost less or have other perceived advantages over products that result in less waste or less toxic wastes at the end of their useful lives. Economic incentives can be combined

with regulatory measures and educational activities in a comprehensive source reduction program.

(1) Quantity-based Collection Fees

Public and private waste collection services can make customer fees commensurate with the quantity of waste generated for collection or with the frequency of collection. Variations of quantity-based fees exist but are generally designed to increase the cost of solid waste collection service to those households or businesses that produce more solid waste. In effect, those who reduce the quantity of waste generated are rewarded. To date, these systems have been employed to a limited extent, and their effectiveness has not been fully assessed.

Pros:

- By fostering consumer demand, rewards manufacturers of products designed to result in less toxic and lower quantity waste.
- Fosters "pay-as-you-throw" principle
- Increases consumer awareness
- Reduces quantity and toxicity of wastes
- Free market system functions as before.
- Can be used as marketing device by waste management services.

Cons:

- Effectiveness is unproven
- May lead to littering of shopping centers, schools, and roadsides

- Does not reduce waste toxicity.

(2) Taxes, Surcharges, Tax Credits, Subsidies, and Seed Money.

Options that fall in this category have long been used to foster special causes and projects. Acceptance of such measures is reflected in the continued existence of depletion allowances, freight rate subsidies and excise taxes. These economic devices can be used to sensitize manufacturers and consumers to waste quantity and toxicity. They can alter production and consumption practices and can also serve to generate revenue to manage wastes generated. Taxes on less desirable products do not preclude manufacturers from producing them nor consumers from buying them; free choice continues to function. However, they can raise issues of equity among economic classes, i.e., potential for greater impact on the poor. None of these measures need be permanent. Rather, they can be applied to instigate changes to the existing system and be lifted later.

The likely success of the measures in this category in fostering the objectives of source reduction cannot be projected. However, they can provide incentives for manufacturers and consumers to alter their habits and can serve as a catalyst for new research and new projects.

For every product sold, levy a waste charge, identified as such on the package, commensurate with the quantity of waste resulting at the end of the useful life of the product or package.

Pros:

- Increases consumer and manufacturer awareness

- Fosters "pay-as-you-throw" principle.
Rewards manufacturers and consumers of low-waste products.
- Reduces quantity of wastes
- Generates revenues for waste management operations and research

Cons:

- Complex to implement
- It may be hard to justify the targets and size of tax.
- Administering the changes is costly
- Interstate commerce concerns (if levied by state)
can make this measure difficult to implement.

Tax rebates to consumers and/or manufacturers of reusable, repairable, remanufacturable, more durable, or refillable containers.

Pros:

- Increases consumer and manufacturer awareness
- Reduces quantity of wastes

Cons:

- Administering rebates is complex
- A revenue source is needed for rebates

Tax credits or subsidies for manufacturers conducting source reduction activities such as product redesign, product line modification, research and development (e.g. development of self-balancing automobile wheels to prolong tire life).

Pros:

- Fosters consumer awareness

- Enhances consumer opportunity to buy desirable products.
- Functions through existing tax system
- Installs waste management as a decision-making factor for manufacturers and marketers.

Cons:

- Requires administrative guidance and oversight

Tax credits or subsidies for businesses specializing in the repair/restoration of products.

Pros:

- Reduces quantity of wastes
- Tax credits function through existing tax system

Cons:

- Requires administrative guidance and oversight

Tax credits or subsidies to businesses participating in efforts to standardize products to facilitate repairability and interchangeability of parts.

Pros:

- Reduces quantity of wastes
- Tax credits function through existing tax system
- Reduces consumer costs for product repair

Cons:

- Requires administrative guidance and oversight
- Detracts from corporate competition

Subsidies to remedy freight rate inequities for reusable, refillable containers (and any other inequities identified).

Pros:

- Not complex to implement/administer
- Reduces quantity and toxicity of wastes

Cons:

- Revenues are required for subsidies

Loans or grants could be given to stimulate research or initiation of pilot projects related to source reduction objectives.

Pros:

- Fosters reduced quantities and toxicity of waste
- Increases industry participation and competition
- Free market system functions as before

Cons:

- Requires administrative guidance and oversight
- Requires revenues

Economic incentives, in general, can be excellent tools to reinforce regulations or awareness activities. They would be most effective as one component of a comprehensive source reduction program employing a variety of approaches.

C. Education and Recognition - Leading to Voluntary Actions

One of the main challenges for promoting source reduction is to access the tremendous potential for voluntary actions on the part of individuals and corporations. To motivate these actions it is important to identify areas where source reduction objectives overlap economic interest.

If the concept of source reduction is unknown or unclear, then even those who would make decisions and act in support of source reduction objectives cannot knowingly do so. Through education, various groups

learn about source reduction goals and supportive actions they can take. Through recognition, those who act to foster source reduction are rewarded. Options in this category can be used in concert with regulatory and economic incentives and disincentives.

(1) Manufacturers, Designers, Marketing Representatives, and Retailers

The potential exists for corporate America to assume a meaningful and effective leadership role in fostering source reduction. Of its own volition, corporate America can exert substantial influence among corporate bodies, on government, and on consumers across the nation.

Designers and the institutions in which they are trained can learn to incorporate source reduction concerns in classes and on the job. Advertising agencies can learn to look at source reduction qualities as positive attributes that can be used to sell products and inform consumers about their benefits.

The options listed below aim to stimulate source reduction by targeting the design and manufacturing aspects of a product's life cycle.

- (a) Awards: Well-publicized awards can be given to manufacturers, designers, marketing and advertising agencies, and retailers making outstanding efforts to produce or promote nontoxic, reusable, durable goods that result in less waste or less toxic wastes. Recipients could use the awards to enhance their marketing strategies.

- (b) Product Logos (Positive Labeling): A highly-publicized source reduction logo could be developed for corporate use on products that help to reduce the toxicity or quantity of waste resulting at the end of the products' useful lives, or which otherwise replace less desirable products or materials.
- (c) National Source Reduction Corporate Council: A National Source Reduction Corporate Council could be formed to review and develop policies; maintain dialogue among governments, manufacturers, retailers, and advertisers; issue awards; and develop and promote logos and seals.
- (d) Voluntary Procurement Policies: Procurement policies that consider source reduction issues were described earlier as an action that could be required of government institutions. Corporations are also large-quantity procurers that could foster source reduction through voluntary changes in procurement practices.
- (e) Industry-wide Packaging Guidelines: Industry-wide packaging guidelines could be used to foster increased consideration of source reduction concerns in the design of products, containers and packaging, thereby reducing the quantity and toxicity of wastes.
- (f) Corporate Research and Development: Voluntary research, development, and marketing activities can increase production of goods that are more durable or increase the durability of other products, thereby fostering source

reduction (e.g., development of a tire valve stem that displays a visible or audible signal if tire pressure declines enough to reduce the tire's service life). Thus, repairability and durability can become new market areas for industry through development of repair modules and products to increase the useful lives of other, higher valued products.

- (g) Joint Research: Government-industry cooperation can lead to developing and implementing a joint research agenda. This would allow even small businesses that are unable to support their own research and development programs to participate in source reduction research and development activities.
- (h) Seminars or Forums for Designers and Design Professors: Source reduction concerns are not generally factors considered in the design of a product, container or package. Seminars or forums could be used to exchange information on source reduction concerns and on current practices in the education and work of designers in order to identify ways to incorporate consideration of source reduction concerns.

All of the above options will serve to raise awareness and stimulate source reduction. Each however, has certain advantages and disadvantages:

Pros:

- The options, coupled with consumer awareness, target responsible entities; those who design, make, package, market, and sell products that result in waste at the end of their useful lives.
- They are feasible to implement
- They complement consumer awareness activities.

Cons:

- Direct measurement of results may not be possible for all options
- Over the short term, costs may exceed quantifiable benefits, making program susceptible to corporate budget cuts.
- With major benefits likely only over the long term, short-term discouragement is possible.

(2) Consumers

As procurers, the general public and businesses are generally not well informed about solid waste management problems, source reduction objectives, or what they themselves contribute to the problem and could do to minimize their impact. The options listed below would target the procurement, consumption, and use stages of a product's life cycle.

Media/public Outreach: Through speaking engagements, and articles in magazines, newspapers and organization newsletters, the concept of source reduction and the role of the consumer can be conveyed.

In-store Shopper Awareness Campaigns: Consumers can be reached at the point of purchase by using informational labeling or posters highlighting the value of products, containers, or packaging with source reduction qualities.

School Curricula: Through educational materials, class discussions and projects, young consumers can learn about source reduction and ways that they can act to minimize their impact on the solid waste problem. An added benefit to this option is that children often have a significant impact on the purchasing habits of those with whom they live.

Raising Consumer Awareness: Like the options that will stimulate corporate awareness, the above measures can serve to raise consumers' awareness of the solid waste problem by attacking it at the source. Consumer awareness-raising measures, however, have both pros and cons:

Pros:

- Waste toxicity and quantity can be reduced
- Influencing consumers can in turn influence manufacturers
- The options are feasible to implement
- The free market system functions as before.

Cons:

- The impact of these measures may be hard to quantify.

Conclusions

So what is a body to do? As might be gathered from the above discussions, there are many approaches to encouraging source reduction. However, as might be gathered from the discussions, many of the options are controversial and may not be possible to implement in the near future. What the EPA is committed to doing is outlined in Table 1. While these actions are clearly supportive of reducing the generation of solid wastes, there are those who say that it isn't enough. For

example, there are bills being introduced in the Congress to expand the Government's role in encouraging source reduction. One of these, "The Waste Minimization and Control Act", introduced by Senator Baucus in the last session of Congress, would, among many other things, mandate percentage reductions of various waste streams. Then, there are many of the States, who are pursuing various combinations of the options discussed in this paper. One thing does seem clear. There is considerable support among the populace for reducing solid waste problems and there is at least some support for ideas, such as source reduction that would enable consumers to participate in new approaches to solving environmental problems. There may be a lot of potential returns to be realized for those who can effectively harness this support to create source reduction approaches.

TABLE 1

**Steps for EPA to Encourage Increased
Source Reduction Activities**

Minimize Toxic Constituents and Materials in Waste

Determine which products, if any, are sources of lead and cadmium	JANUARY 1989
Screen for potential substitutes for lead and cadmium .	AUGUST 1989
Evaluate regulatory and non-regulatory options for restriction on, or substitution for lead and cadmium in products	NOVEMBER 1989
Initiate investigation of other toxic constituents in products	DECEMBER 1989
Evaluate need for Federal testing guidelines	NOVEMBER 1989

Minimize the Amount of Waste Generated

Study on economic incentives	DECEMBER 1989
Establish corporate recognition program	SEPTEMBER 1989
Design for source reduction workshops	JULY 1989

Increase Procurement of Products with Source Reduction Attributes

Form Federal Task Group to study procurement (same group as for procurement of recycled products) .	NOVEMBER 1989
Study of possible changes in procurement policies . . .	JUNE 1990

Study Ongoing or Potential Source Reduction Policies

Degradable Plastic Study by General Accounting Office .	SEPTEMBER 1988
Initiate database for tracking state source reduction programs	JUNE 1989

**NEXT STEP FOR EPA TO ENCOURAGE INCREASED
SOURCE REDUCTION ACTIVITIES**

EPA Report to Congress on Plastics	JUNE 1989
Initiate user fee study.	NOVEMBER 1989
Household Hazardous Waste Conference	NOVEMBER 1989